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Smart Traffic Control for Emergency Vehicles Using IoT

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Abstract: In recent days number of vehicles is increasing day by day, especially in metropolitan cities. As vehicles increases, traffic density also increases on the road, that results us in slowing the speed, it takes more time to reach the destination, increases in vehicle queuing. If there is no control over traffic signals there may chance of getting accidents also. Improvement in the traffic control is required to overcome all these problems. Traditional traffic control system is not enough to control the current traffic density; traffic control system requires some enhancement to the existing system to avoid the traffic congestion. In the proposed work Intelligent Traffic Control System using Global System for Mobile communication (GSM) is used to overcome the congestion on the roads. The density of the vehicles is obtained by connecting the ultrasonic sensors. And depending on the density of the vehicles the traffic light signals are controlled by the microcontroller. The vehicles can also change the route if the traffic is heavy in the current route and information regarding heavy traffic is provided to vehicles in advance through the GSM.

Keywords: Traffic Control, GSM, Ultrasonic sensors, Traffic light signals

I. INTODUCTION

Introduction Traffic clogging [1] has always been a serious problem in densely populated countries like India. According to the data from a worldwide survey by TomTom [2], a leading in-vehicle navigation company, India is the worst-hit country suffering from traffic congestion. This project is aimed at addressing this issue and giving ambulances stuck in these kinds of situations either an automatic green corridor of a short-cut route and at the same time giving patients the top priority on the road. To achieve this, GPS Module and GSM Module SIM900A, Arduino UNO along with Google Maps and Cloud Computing have been used which collects useful information about the paramedic vehicle.

Conventionally, the traffic give way to such emergency vehicles, on hearing the vehicle's siren. However, this is not sufficient in situations where the traffic cannot give path to emergency vehicles at the traffic signals, which is the major reason for delay. Almost all the traffic signals today are automated, when an emergency vehicle passes by an intersection without green signal is a danger to traffic which is approaching the signal from other roads for which the signal is green. Thus to avoid major accidents the emergency vehicle has to wait until the entire traffic signal cycle to complete and gets an official green signal. This is an important reason for the delay in response time of emergency vehicle. Other means emergency vehicle transport like air ambulances are very expensive and are not reasonable for small cities [1].

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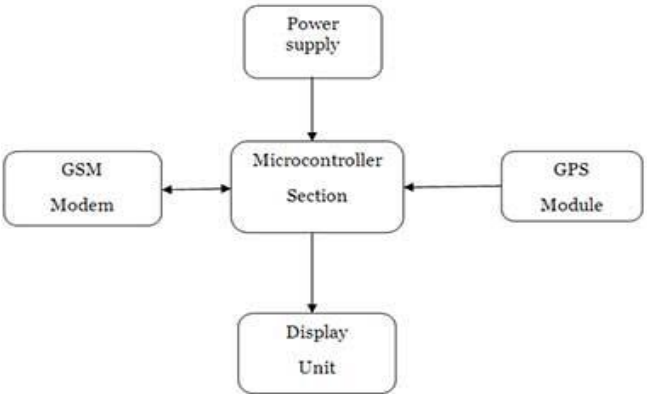
Thus, Traffic Signal Preemption has become the need of the hour, in large cities where traffic situations is a major reason for delay. A successful Traffic signal Preemption will helps to reduce the delay and increasing response time which may be very helpful in saving a large amount of human lives and will also provide road safety to other traffic with minimum cost.

II. PROPOSED SYSTEM

We enhances our already exiting project by adding GPS and GSM system. So we can achieve accuracy on long distance measurement and priority of the vehicle. By replacing RFID system with GPS and GSM to extent the range .In RFID range only between 2 meters to 15 meters. By our project we build range as user defined for conjunction of lot of vehicles that are using nowadays.

III.DEMO DIAGRAM



IV. GPS DESCRIPTION

Satellite Navigation is based on a global network of satellites that transmit radio signals in medium earth orbit. Users of Satellite Navigation are most familiar with the 31 Global Positioning System (GPS) satellites*. The United States, who developed and operates GPS, and Russia, who developed a similar system known as GLONASS, have offered free use of their respective systems to the international community. The International Civil Aviation Organization (ICAO), as well as other international user groups, have accepted GPS and GLONASS as the core for an international civil satellite navigation capability known as the Global Navigation Satellite System (GNSS).

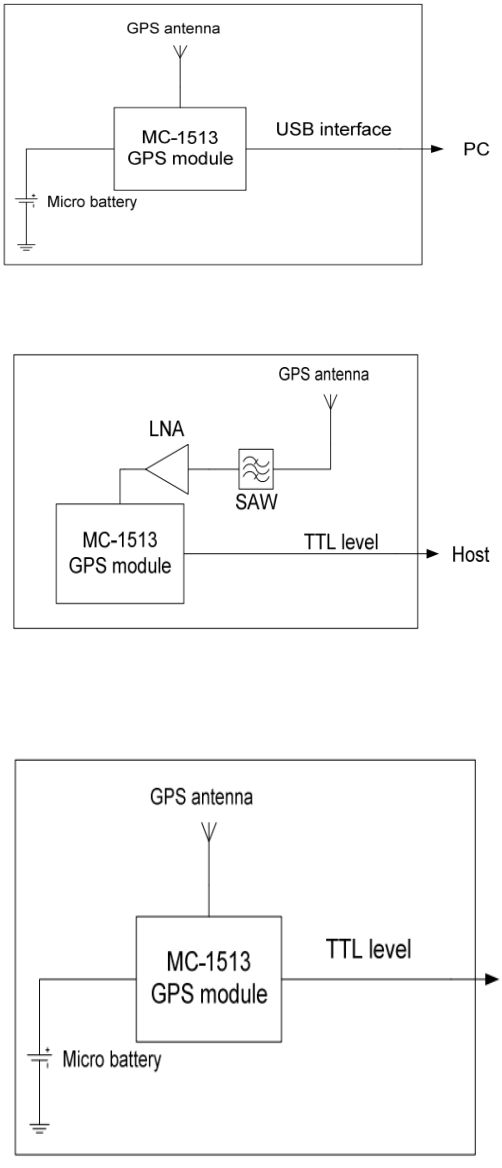


Fig 3-2 System block diagram of LS20031

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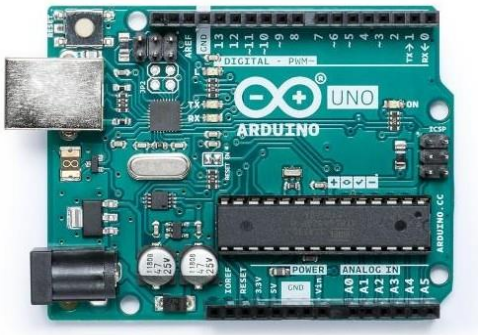
V. ARDUNIO



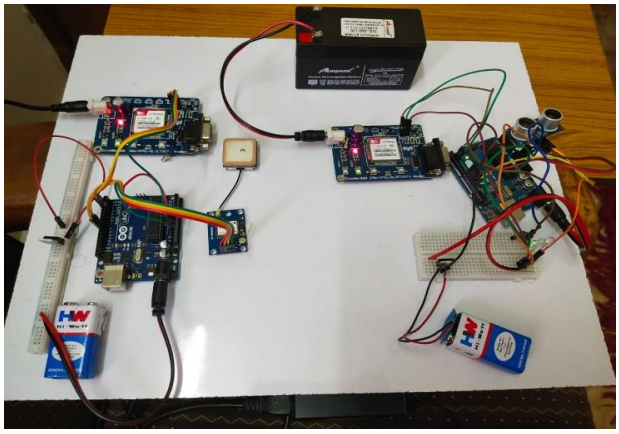
The UNO is the best board to get started with electronics and coding. If this is your first experience tinkering with the platform, the UNO is the most robust board you can start playing with. The UNO is the most used and documented board of the whole Arduino family. Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

VI.ULTRA SONIC SENSOR

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:

- Using IO trigger for at least 10us high level signal,
- The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.
- If the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning.

Test distance = (high level time × velocity of sound (340M/S) / 2



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